

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading and unloading of material into and from [onto] a body of [said] the vehicle;

[a] an electronic processing [first processor] means on-board [said] the vehicle for acquiring the first set of data from [at least said] the first means and organizing [said] the first set of data to provide information regarding the execution of a haulage event [the performance] of [said] the vehicle; and

a [second means] storage medium for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

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2. (Once Amended) [A] The system as set forth in claim 1 including [third] second means mounted to [said] the vehicle for providing a second set of data indicative of [the] a direction of movement of [said] the vehicle and delivering the second set of data to [said] the [first processor] electronic processing means to be incorporated into [said] the information.

3. (Once Amended) [A] The system as set forth in claim 2 wherein [said third] the second means is a compass.

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4. (Once Amended) [A] The system as set forth in claim 2 herein [said third] the second means includes a device for detecting a forward-neutral-reverse status of a drive train associated with [said] the haulage vehicle.

5. (Once Amended) [A] The system as set forth in claim 1 including [third] second means for providing a second set of data identifying [said] the vehicle and distinguishing it from other vehicles and delivering the second set of data to [said] the [processor] electronic processing means to be incorporated into [said] the information.

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6. (Once Amended) [A] The system as set forth in claim 5 wherein the first means includes a sensor for detecting the raising of the body for [including fourth means for sensing an] unloading of [said] the material [loaded onto said] in the body and providing a third set of data indicative of [said] the unloading to [said] the [first processor] electronic processing means to be incorporated into [said] the information[; and

a fifth means responsive to said information for determining the elapsed time between said haulage events].

7. (Once Amended) [A] The system as set forth in claim [6] 34 including a [sixth] third means for incorporating the [data related to said] elapsed times of the haulage cycles into [said] the historical data base

and a fourth [seventh] means for delivering control data based on the information in [from said] the historical data base for routing [said] the vehicle to selected locations.

8. (Once Amended) [A] The system as set forth in claim 5 including a [fourth] third means [and] responsive to [said] the [first processor] electronic processing means for downloading [said] the information to a remote site which includes [said] the storage medium [second means].

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9. (Once Amended) [A] The system as set forth in claim 8 wherein [said] the remote site includes a [second] central electronic processing [processor] means responsive to [said] the downloaded information and [said] the historical data base of haulage [events] cycles for providing a third set of data for use in directing [the] a future operation of [said] the vehicle.

10. (Once Amended) [A] The system as set forth in claim 9 wherein [said] the haulage vehicle is loaded by a bucket of a loading equipment and [said] the [first processor] electronic processing means includes means for determining the weight of each bucket and [said] the historical data base of haulage events includes an average weight of a bucket over a plurality of loading cycles for [said] the loading equipment.

11. (Once Amended) [A] The system as set forth in claim 8 wherein [said] the haulage vehicle is loaded by a bucket of a loading equipment, [said] the system including [fifth] fourth means for determining when material carried by [said] the bucket is loaded onto [said] the body and incorporating [said] the determination into [said] the information.

12. (Once Amended) [A] The system as set forth in claim 11 wherein [said sixth] fifth means includes means for determining [the] an elapsed time from the loading of a first bucket in a load to the loading of a last bucket.

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13. (Once Amended) [A] The system as set forth in claim 12 including sixth means for recording the identity of [said] the loading equipment and associating [said] the identity with [said] the determination of when [said] the bucket is loaded onto [said] the body.

14. (Once Amended) [A] The system as set forth in claim 13 wherein [said] the sixth means includes means for delivering [said] the identity of [said] the loading equipment and the associated determination of when [said] the bucket is loaded onto [said] the body to [said] the electronic processing [first processor] means [to be] for incorporation into [said] the information and [made part of said] the historical data base of haulage events.

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15. (Once Amended) [A] The system as set forth in
claim 1 including [third] second means mounted to [said]
the vehicle for marking the first set of data from [said]
the first means [which] with an indication of a time the
first set of data is collected and delivering [said] the
marked first set of data to [said] the [first processor]
electronic processing means to be incorporated into [said]
the information.

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16. (Once Amended) [A] The system as set forth in
claim 1 including [third] second means for providing a
second set of data indicative of the unloading of [said]
the material by [said] the body and delivering the second
set of data to [said] the electronic processing [first
processor] means to be incorporated into [said] the
information.

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17. (Once Amended) [A] The system as set forth in
claim 1 including [third] second means for providing a
second set of data indicative of the distance traveled by
[said] the vehicle and delivering the second set of data
to [said] the [first processor] electronic processing
means to be incorporated into [said] the information.

18. (Once Amended) [A] The system as set forth in
claim 1 including [third] second means for providing a
second set of data indicative of the geographic location
of [said] the vehicle and delivering the second set of

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data to [said] the [first processor] electronic processing
means to be incorporated into [said] the information.

19. (Once Amended) [A] The system as set forth in
claim 1 including [third] second means for providing a
second set of data indicative of the entity controlling
[said] the vehicle and delivering the second set of data
to [said] the [first processor] electronic processing
means to be incorporated into [said] the information.

20. (Once Amended) [(Comment: Load plus time)] A
system for acquisitioning and accumulating data indicative
of [the operation of] haulage events executed by a haulage
vehicle, [said] the apparatus comprising:

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first means mounted to [said] the vehicle for
providing a first set of data indicative of a loading of
material onto a body of [said] the vehicle;

second means for providing a second set of data
indicative of [the] a relative time of the loading [events
related to the hauling] of [said] the material sensed by
[at least said] the first means;

a electronic processing [first processor] means
on-board [said] the vehicle for acquiring the first and
second sets of data from the [at least said] first and
second means and organizing [said] the first and second
sets of data to provide information regarding the
execution of a haulage event by [performance of said] the
vehicle; and

a storage medium [third means] for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

21. (Once Amended) [(Comment: Load plus dump)] A system for acquisitioning and accumulating data indicative of [the operation of] haulage events executed by a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data indicative of the unloading of [said] the material by [said] the body;

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a electronic processing [first processor] means on-board [said] the vehicle for acquiring the first and second sets of data from [at least said] the first and second means and organizing [said] the first and second sets of data to provide information regarding the execution of a haulage event by [performance of said] the vehicle; and

a storage medium [a third means] for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

22. (Once Amended) [(Comment: Load plus distance)]

A system for acquisitioning and accumulating data indicative of [the operation of] haulage events executed by a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data indicative of [the] a distance travelled by [said] the vehicle;

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a [first processor] electronic processing means on-board [said] the vehicle for acquiring the first and second sets of data from [at least said] the first and second means and organizing [said] the first and second sets of data to provide information regarding the execution of a haulage event by [performance of said] the vehicle; and

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a storage medium [third means] for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

23. (Once Amended) [(Comment: Load plus location)]

A system for acquisitioning and accumulating data indicative of [the operation of] haulage events executed by a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data indicative of [the] a geographic location of [said] the vehicle;

a [first processor] electronic processing means on-board [said] the vehicle for acquiring data from [at least said] the first and second means and organizing [said] the data to provide information regarding the execution of a haulage events by [performance of said] the vehicle; and

a storage medium [third means], for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

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24. (Once Amended) [(Comment: Load plus Control No.)] A system for acquisitioning and accumulating data indicative of haulage events executed by [the operation of] a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data indicative of [the] an entity controlling [said] the vehicle;

a [first processor] electronic processing means on-board [said] the vehicle for acquiring the first and second sets of data from [at least said] the first and second means and organizing [said] the first and second sets of data to provide information regarding the execution of a haulage events by [performance of said] the vehicle; and

a storage medium [third means] for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

25. (Once Amended) [(Comment: Load plus I.D. No.)]
A system for acquisitioning and accumulating data indicative of haulage events executed by [the operation of] a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data identifying [said] the vehicle and distinguishing it from other vehicles;

a [first processor] electronic processing means on-board [said] the vehicle for acquiring the first and second sets of data from [at least said] the first and second means and organizing [said] the first and second sets of data to provide information regarding the

execution of a haulage event by [performance of said] the vehicle; and

a storage medium [third means] for accumulating [said] the information from [said] the [first processor] electronic processing means so as to create a historical data base of haulage events as defined by [said] the information.

26. (Once Amended) [(Comment: Load plus fuel)] A system for acquisitioning and accumulating data indicative of haulage events executed by [the operation of] a haulage vehicle, [said] the system comprising:

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first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data indicative of fuel usage of [said] the vehicle;

a [first processor] electronic processing means on-board [said] the vehicle for acquiring the first and second sets of data [from at least said first and second means] and organizing [said] the first and second sets of data to provide information regarding the execution of haulage events by [performance of said] the vehicle; and

a storage medium [third means] for accumulating [said] the information from [said first processor] the electronic processing means so as to create a historical data base of the haulage events as defined by [said] the information.

27. (Once Amended) [(Comment: Load plus Downloading)] A system for acquisitioning and accumulating data indicative of haulage events executed by [the operation of] a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for providing a first set of data indicative of a loading of material onto a body of [said] the vehicle;

second means for providing a second set of data identifying [said] the vehicle;

a [first processor] electronic processing means on-board [said] the vehicle for acquiring the first and second sets of data from the [at least said] first and second means and organizing [said] the first and second sets of data to provide information regarding the execution of a haulage event by [performance of said] the vehicle; and

a third means mounted to [said] the vehicle for downloading [said] the information to a remote site.

28. (Once Amended) [(Comment: Historical Data Base)] [A] The system as set forth in claim 27, [said] the remote site including [a second processor] electronic processing means for receiving [said] the information, [said] the [second processor] electronic processing means including means for creating and updating a historical data base of the haulage events as defined by [said] the information.

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29. (Once Amended) [(Comment: Haul Cycle)] A system for tracking the time of a haul cycle for a haulage vehicle, [said] the system comprising:

first means mounted to [said] the vehicle for sensing the loading and unloading of a load carried by [said] the vehicle and providing respective first and second sets of data in response thereto; and

[second means for identifying said vehicle;]

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a [first processor] electronic processing means on-board [said] the vehicle responsive to [said first and second means for generating] the first and second sets of data indicative of the [dumping or] loading and unloading of [said] the vehicle for determining the elapsed time of a haul cycle for the vehicle [load and associating said data with said data identifying said vehicle to form a data stream; and]

[second means responsive to said data stream for determining the time of a haul cycle to be defined in specification for said vehicle].

30. (Once Amended) [A] The system as set forth in claim 29 including:

[third] second means responsive to the electronic processing means for creating a data base from [said] the elapsed times of the haul cycles [times] and processing [said data] the data base [stream] to derive control data for commanding the routing of [said] the vehicle to selected locations.

31. A system for acquisitioning and accumulating data indicative of haulage cycles executed by a haulage vehicle, the system comprising:

first means mounted to the vehicle for providing a first set of data indicative of a loading and unloading of material into and from a body of the vehicle;

an electronic processing means on-board the vehicle for acquiring the first set of data from the first means and organizing the first set of data to provide information regarding the execution of a haulage event of the vehicle.

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32. The system as set forth in claim 31 including a storage medium for accumulating the information from the electronic processing means so as to create a historical database of the haulage cycles as defined by the information.

33. The system as set forth in claim 1 including third means mounted to the vehicle for providing a second set of data indicative of the stopping of the vehicle and delivering the second set of data to the electronic processing means to be incorporated into the information.

34. The system as set forth in claim 1 including a second means responsive to the information for determining an elapsed time for a sequence of haulage events defining a haulage cycle.

35. The system as set forth in claim 8 including a fourth means for providing a third set of data indicative of the geographic location of the vehicle and delivering the third set of data to the remote cite.

36. The system as set forth in claim 29 including a second means for providing a third set of data identifying the vehicle and the electronic processing means including means responsive to the second means for marking the elapsed time of a haul cycle with the third set of data so that the elapsed time of a haul cycle is identified with the vehicle.

REMARKS

In the Office Action mailed June 21, 1990, claims 1-30 have been rejected under 35 U.S.C. §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter of the invention. In this regard, paragraph 20 of the Office Action includes an extensive list of specific objections directed to various claims of the claim set. Applicant has carefully considered these objections and made extensive amendments to the claims in order to overcome the §112 rejection. Without dealing with each of the objections separately in these remarks, each of the objections made in paragraph 20 have been addressed by specific amendments to the claims. Therefore, the claims should now be in good order for allowance. Applicant